

Benjamin Franklin: Scientist, Writer, Inventor

4-5 Grade STEM Start-Ups



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1. BENJAMIN FRANKLIN: SCIENTIST, WRITER, INVENTOR

Primary Resource: “Benjamin Franklin: Scientist, Writer, Inventor” by Kira Freed, adapted from America’s Story courtesy of the Library of Congress

Adapted by: Louisiana Believes Guidebook



1.1. INTRODUCTION

Benjamin Franklin is one of the Founding Fathers of the United States. He assisted with the drafting of the Declaration of Independence and the U.S. Constitution, was a printer and writer, and conducted various scientific investigations. In this lesson, students will read closely a nonfiction text and will explain the relationship between two or more main ideas by using knowledge of text structure.

Finally, students will work together to solve a design challenge, helping Ben Franklin create a new kite to use in his upcoming experiments. Because there are various types of kites that could be built, students will have to research kites. Students will also need to think beyond the core construction of the basic kite by asking questions. For example, does the flight change if there is no tail, one tail, two tails? Or what length of string works best and how is the length of the string related to the launch of the kite? The students will engage effectively in a range of collaborative discussions with diverse partners to build on others’ ideas and express their own clearly. Students will review ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.

1.2. MATERIALS

- “Benjamin Franklin: Scientist, Writer, Inventor” by Kira Freed, adapted from America’s Story courtesy of the Library of Congress; http://mrssirosigradefive.weebly.com/uploads/3/8/8/4/38848107/ben_franklin-inventor_printer_writer-1.pdf
- Tissue Paper or any other lightweight paper
- Wooden skewers
- String
- Ruler
- Markers /Crayons
- Tacky Glue / Hot Glue (pick one)
- Stapler
- Ribbon
- Plastic File Folder / Construction Paper/ Cardstock (pick one)

1.3. LANGUAGE ARTS WORK

1.3.1. EXPLORE THE TEXT

- Students will read the text closely, underline, and annotate the text to help answer the following questions in their reading journal:
 - Reread the first paragraph on page 2 of the article. How did children in the 18th century choose a job? What did Ben Franklin’s father first choose as Ben’s future job?
 - Reread paragraph 3 on page 2 of the article. What is an “apprentice”?
 - What caused Ben Franklin to run away at the age of 17?
 - What does this tell you about Ben Franklin’s personality?

1.3.2. PART 2

- Students will read closely, analyze text structure, and write a paragraph on the following prompt: How did Ben Franklin’s decisions as a young man shape his future accomplishments?
 - Reread the section headed “Ben Franklin, the Printer.” Fill out the following cause and effect chart in your reading journal to help direct your thinking and write your paragraph.

Cause	Effect
Father will decide what Ben will do.	
School is too expensive and long.	
Brother died at sea.	
Ben becomes brother’s apprentice and learns rapidly.	

- Write a paragraph for the prompt: How did Ben Franklin’s decisions as a young man shape his future accomplishments?
 - Include evidence from the text to support your answer.

1.4. DESIGN CHALLENGE

Benjamin Franklin’s dangerous kite experiment has become a great legend in American history. Almost everyone has heard of Franklin tying a key to the end of a kite string and then flying the kite into a thunderstorm. The kite was hit by lightning and Zap! Benjamin discovered electricity. Since Ben Franklin discovered the electrical nature of lighting, he wants to conduct more electrical experiments. He will need to fly another kite again to gather more data, but this might be a problem because his kite was destroyed in the thunderstorm.

Your task is to research and build a new kite for Ben Franklin to use for his upcoming experiments. The goal is to construct a kite that will fly for at least 1 minute using the materials provided.

1.5. DESIGN PROCESS

In their reading journal, students will answer the following questions:

- Ask:
 - What is the problem?
 - What are the materials?
 - What are the constraints?
- Brainstorm:
 - What are some ideas?
- Plan:
 - Draw and label a sketch for your solution.
- Test:
 - Was your challenge successful? Why or why not?
- Improve/Reflection:
 - If you were to complete the challenge again, what would you keep the same and what would you do differently? (Justify/provide evidence for each answer).

1.6. RUBRIC

Category	Developing (1)	Good (2)	Excellent (3)	Score
Language Arts Work	Answers are not correct. Evidence from the text does not correlate with the questions.	Answers are on track but not fully correct. Evidence from the text is attempted to support answer.	Questions are answered correctly with evidence from the text to support answer.	

Design Process	<p>Brainstorming: Ideas are unclear to connect to problem.</p> <p>Plan/Create/Build: The design and model is not aligned with the criteria, constraints, and intent of the problem.</p> <p>Improve/Reflection: Student only explains one concept either what would be kept the same or what would be changed. Also, does not provide evidence for response.</p>	<p>Brainstorming: Ideas are somewhere aligned to problem but need explanation to make clear.</p> <p>Plan/Create/Build: The design and model is somewhat aligned with the criteria, constraints, and intent of the problem.</p> <p>Improve/Reflection: Student explains what would be kept the same and what would be changed, but does not provide evidence for response.</p>	<p>Brainstorming: Ideas are aligned to problem.</p> <p>Plan/Create/Build: The design and model is aligned with the criteria, constraints, and intent of the problem.</p> <p>Improve/Reflection: Student explains what would be kept the same and what would be changed. Provides evidence for response.</p>	
Collaboration	<p>Ignores and distracts others.</p> <p>Shows no understanding of project and has a negative attitude during work time.</p> <p>Argues with others and does not ask or answer any questions.</p>	<p>Listens respectfully and follows directions.</p> <p>Shows understanding of project and sometimes argues with others.</p> <p>Asks and answers questions.</p>	<p>Listens respectfully and engages in discussion.</p> <p>Shows understanding of project and has a positive attitude during work time. Never argues with others.</p> <p>Asks and answers questions and provides evidence to support answers.</p>	

1.7. RESOURCES

- “Benjamin Franklin: Scientist, Writer, Inventor” by Kira Freed, adapted from America’s Story courtesy of the Library of Congress:
http://mrssirosigradefive.weebly.com/uploads/3/8/8/4/38848107/ben_franklin_inventor_printer_writer-1.pdf

This 5 Step Engineering Design Process template can help the students answer the questions for the design process during their challenge:

- The Works: The Hands On Museum: <http://teachers.egfi-k12.org/wp-content/uploads/2010/05/Post-lesson-Student-Activities-Engineers-and-the-Engineering-Design-Process.pdf>